with the thoroughness and success with which it has reformed and revivified every branch of higher education. CLOUDESLEY BRERETON.

Principal works consulted :—" Ministère de l'Instruction Publique et des Beaux Arts; (1) Statistique de l'Enseignement Supérieur; (2) Introduction à la Statistique de l'Enseignement Supérieur, par M. L. Liard, Directeur de l'Enseignement Supérieur. (Paris : Imprimerie Nationale, MDCCCC.) (3) " Législation et Jurisprudence de l'Instruction Publique. Extrait du Répertoire du Droit administratif." Première partie, Historique et Organisation générale; Deuxième partie, Enseignement Supérieur; Sixième partie, Écoles ne relevant du Ministère de l'Instruction Publique. (Paris : P. Dupont, 1903.)

THE RESUSCITATION OF THE APPARENTLY DROWNED.

IN 1862 a committee, which included several eminent medical men and physiologists—amongst the latter Dr., now Sir, John Burdon Sanderson—was appointed by the Royal Medical and Chirurgical Society to investigate the phenomena attendant upon drowning, and the methods which had been recommended for the recovery of apparently drowned persons. That committee made a number of experiments in man upon the dead subject, and upon animals during life, and the results they obtained were duly published in the *Transactions* of the society. But it appeared important to renew the inquiry with modern methods, and a second committee for the investigation of this important subject was accordingly appointed a few years ago, with Prof. Schäfer as chairman. This second committee attempted, in the first instance, to pursue the inquiry as to the best means of carrying on artificial respiration, in the same manner as the 1862 committee, *i.e.* upon the cadaver, but met with grave difficulties from the outset in the enormous resistance which the condition of *rigor mortis* sets up to effecting changes of volume of the chest, a difficulty which had been also met by the earlier committee, and very imperfectly surmounted. The new committee accordingly decided to discard the cadaver, and to endeavour to determine in the living human subject how great an amount of air could be moved into and out of the lungs by movements imparted to the thorax by the agency of external force. This force was applied either by intermittent traction upon the arms, or by intermittent pressure upon the thorax, the subject being either in the supine or prone position, and remaining perfectly passive during the short period of the experiment. The amount of air taken in and given out was measured in a graduated vessel, or by means of an ordinary gasometer.

The results showed that by all methods which have been suggested for the performance of artificial respiration, viz. the Silvester traction method, the Marshall Hall rolling method *plus* compression of thorax, the Howard method of compression of thorax in the supine position, and also a similar method of pressure upon the thorax with the subject in the prone or semi-prone position, an amount of air can be drawn into and driven out of the thorax which is at least as great as the amount of air exchanged in the ordinary tidal respirations of the individual. This being so, it is evident that, in selecting a method of artficial respiration for restoring the drowned, one should be guided less by the actual amount of air which any given method is capable of exchanging than by other considerations, such as the facility offered for the escape of water and mucus from the air passages, and the preventing of the tongue from falling back and blocking the fauces, both of which objects are better attained by the lateral and prone than by the supine position. It was further clear that it is more easy to effect artificial respiration by exerting intermittent pressure upon the thorax than by arm traction, and although the committee do not give instructions for the restoration of the apparently drowned in their report, it is obvious that their conclusions point to the adoption of the prone or semi-prone position of the subject, and to rhythmically intermitted pressure upon the thorax, as the methods which are likely, in the circumstances of drowning, to yield the best results.

The experiments upon animals (which were performed almost entirely upon anæsthetised dogs) are, it is believed, the first in which all the phenomena connected with the circulation and respiration have been graphically recorded during the process of drowning and subsequent resuscitation by artificial respiration. The chief points which they illustrate are the very large amount of water which can be taken into the lungs and become entirely absorbed into the system within a few minutes, without producing any but quite temporary symptoms, the great amount of vagal stimulation which is produced during drowning, and which is, in some instances, sufficient to arrest the heart's action almost entirely, and the extreme variability in the power of resistance to drowning in different individuals of the same species, so that, while a submersion of two minutes is fatal to some individuals, one of seven or eight minutes, or even more, can be borne by others with a fair chance of recovery as the result of the application of artificial respiration. The experiments all point to the supreme importance of commencing artificial respiration at the earliest possible moment, and are, therefore, condemnatory of all instructions for the recovery of the apparently drowned which direct that, before proceeding to apply artificial respiration, the patient should be divested of clothing, hartshorn should be applied to the nostrils, and various other remedies attempted—all of which merely serve to waste time, every second of which is invaluable for combatting the actual condition which is threatening life, viz. the lack of oxygenation of the blood. Incidentally it was found in the course of these experiments that, without sufficient aëration of the blood, even the most powerful cardiac and vascular stimulant—such, for example, as the extract of suprarenal capsule—is entirely unable to assist recovery.

The experiments upon the cadaver were chiefly performed by Mr. Pickering Pick, Mr. Henry Power, and Dr. J. S. Bolton, in London; those upon the living subject by Prof. Schäfer and Dr. P. T. Herring in the physiological laboratory of the University of Edinburgh. The report of the committee was read by Prof. Schäfer at a largely attended meeting, held on May 26 last, at the rooms of the society in Hanover Square.

NOTES.

WE regret to learn that on Saturday, July 25, M. Prosper Henry, of the Paris Observatory, was found lying dead in the La Valoise Valley near Pomogen at an altitude of 1600 metres, in the French Alps. His death appears to have been due to congestion caused by extreme cold. M. Henry was buried at Nancy, his birthplace, on August 1. A number of astronomers was present at the sad ceremony, among them being M. Callandreau, of the Paris Academy of Sciences; MM. Borchart and Fraissinet, of the Paris Observatory; and M. Trépied, director of the Algiers Observatory. M. Prosper Henry and his brother, M. Paul Henry, were attached to the Paris Observatory in 1865, and their work is well known in the astronomical world. Between 1872 and 1882 they discovered fourteen asteroids,

and in the latter year took up the work in celestial photography which has rendered their name famous. It is not too much to say that in many ways they have been the real founders of La Carte du Ciel.

AN International Conference on Wireless Telegraphy was opened at Berlin on Tuesday. We learn from the *Times* that Great Britain is represented by Mr. J. C. Lamb, Mr. J. Gavey, and Mr. R. J. Mackay, of the General Post Office, Captain H. L. Heath, R.N., Lieut. C. R. Payne, R.N., and Colonel R. L. Hippisley. Herr Kraetke, the Imperial Secretary of State for the Post Office, who opened the conference, said that it was intended "to make a clear road for the further extension of wireless telegraphy in order that, all special interests being set aside, the new means of communication might gradually develop to the common benefit of all seafaring peoples. This could only be brought about by the harmonious cooperation of the States interested in the shipping trade." The business of the conference is, however, only preliminary, the main object being to fix upon matter for discussion at a subsequent international conference. This later conference will probably be largely occupied in considering the possibility of standardisation with a view to intercommunication between different systems. We have often pointed out in these columns the extreme desirability of such intercommunication from the point of view of public safety and convenience. When the problem of syntonisation is solved, it will no doubt be possible for one system to work entirely independently of all others, but until that time it is practically necessary that some working arrangement should be made between the different systems which will allow the public to derive from wireless telegraphy the full advantage that it can, as yet, bestow.

MR. R. LYDEKKER, F.R.S., has been elected a foreign member of the R. Accademia dei Lincei, Rome.

MR. W. R. OGILVIE-GRANT, of the Natural History Museum, has returned from his trip to the Azores with a large collection of birds, insects, and land molluscs, the latter including some forms of special interest.

WE learn from the *Times* that Dr. Ludwig Mond, F.R.S., whose death was incorrectly announced by some papers last Saturday, is approaching complete recovery from a nervous breakdown on the shores of Lake Leman.

THE Civil Service Supplementary Estimates include the sum of 45,000*l.* to pay the expenses of the two relief ships *Morning* and *Terra Nova*, which are being sent out by the Admiralty to the relief of the *Discovery*. The estimate includes provision for the purchase of the *Terra Nova* and for the wages of the crews of both vessels; also for stores, coals, provisions, &c.

SEVERE earthquake shocks were experienced in several parts of Italy and Spain last week. Reuter's correspondent at Rome states that several houses and churches at Filattiera and Mulazzo were destroyed by an earthquake on July 31, and a message from Madrid states that at Albuñon, in the province of Granada, severe earthquake shocks, followed by loud and prolonged subterranean rumblings, were felt on July 26, 27 and 28.

THE council of the Institution of Electrical Engineers has now, with the approval of the Physical Society, undertaken the publication of *Science Abstracts* as an Institution publication. In connection with this work, Mr. Louis H. Walter has been appointed editorial assistant to the secretary, and will take up his duties in the autumn.

THE death is announced of Prof. Edmond Nocard in his fifty-fourth year. Prof. Nocard, who was principal of the Veterinary School at Alfort, near Paris, had a world-wide reputation as a veterinary pathologist, and was the author of several important works, of which his "Maladies microbiennes des Animaux" (written in collaboration with Prof. Leclainche) has just reached a third edition. He was also one of the co-editors of the Pasteur's *Annals*. He attended the Tuberculosis Congress in London in 1901, and was a strenuous opponent of Koch's view of the non-transmissibility of bovine tuberculosis to man.

A MEETING of the general committee of the Cancer Research Fund was held on Friday last, July 30, Mr. Balfour, one of the vice-presidents, occupying the chair in the absence of the president, the Prince of Wales. The first annual report, which was submitted, showed that a large amount of preliminary work had already been accomplished during the few months the Cancer Research Fund has been in existence. It was deemed premature to make any detailed statement of the experimental work in progress, but an indication was given that considerable importance is attached to the study of cancer as it occurs spontaneously in the lower animals. For the purposes of this branch of the inquiry, it is sought to secure adequate farm accommodation. Certain statistical data are also in progress of compilation with regard to the proportion of cases in which the clinical diagnosis is verified by the pathological findings, in order that the value of the data upon which existing statistical conclusions are based may be determined and sources of fallacy obviated in future. Sir William Broadbent, in moving a vote of thanks to Mr. Balfour, stated that he thought that in the course of the work now being inaugurated, the nature, cause, and cure of cancer would be arrived at. Whatever method of cure might be proposed, it would receive careful investigation. Mr. Balfour, in his reply, alluding to the interest which everyone must take in the cancer problem, said he was surprised that only 213 persons had contributed to the fund. One anonymous donor had promised 5000*l.* if thirteen other individuals, or groups of persons, would each contribute a like amount, but up to the present this appeal had not been successful. Considering the progress that had been made in all departments of medical science during the last century, he believed that there was every reason to hope that the investigations of the committee would ultimately prove successful. The Cancer Research Fund now amounts to about 52,000*l.*, but in order to pay the expenses of the work out of the income of the fund, the amount originally estimated, viz. 100,000*l.*, will be necessary.

A CORRESPONDENT of the *Times* states that Lieut. Kolchak has started from the Arctic coast for the New Siberian Islands in search of Baron Toll, the head of the Russian Polar expedition which left St. Petersburg three years ago in the yacht *Zaria*. If Baron Toll be not found on the New Siberian Islands, then Lieut. Kolchak will endeavour to reach Bennett Island, about eighty miles further north-west. A year ago last May Baron Toll, with the astronomer Seeberg and two native Yakuts, left the *Zaria* off Kotlin Island with a view of reaching Bennett Island over the ice. In case the *Zaria* should not be able to follow them, which eventually turned out to be the case, the party hoped to be able to return independently to the New Siberian Islands; but it is supposed that Baron Toll had not dogs enough with him for this purpose, and was therefore obliged to winter on Bennett Island. In regard to food, all the members of his party are excellent hunters, and in case

the baron should have succeeded in making his way back to the New Siberian Islands in the spring, he and his companions will have an ample supply of provisions in the stores which he himself left there for Nansen in 1893. According to notes left by Seeberg on New Siberia, which is the last news received of the expedition, Baron Toll's party must have left there about the beginning of July of last year to explore Bennett Island.

IT is announced that a wireless telegraphy station is to be erected at Port Arthur at a place known as Golden Mountain. The object is to establish regular communication with Russian warships in the Gulf of Pechili. The system to be used is not stated.

THE Cable Makers' Association, which represents the chief makers of insulated wire in this country, has decided to put on the market a special quality of flexible cord which shall be quite safe and trustworthy under all conditions of ordinary use. The importance of installing good quality flexible cord cannot be overestimated, as the loose wire is subjected often to rough treatment, and is very liable to be in the neighbourhood of inflammatory material. The cord which the Association proposes to make is to be insulated with pure and vulcanised indiarubber, and will have a minimum insulation resistance of 600 megohms per mile after twenty-four hours' immersion in water; the insulation will also be tested with 1000 volts alternating current for fifteen minutes. The cord will bear a special label and trade mark for the purpose of distinguishing it.

THE twenty-fifth annual report of the Deutsche Seewarte for 1902 will be noteworthy in the history of that useful institution by the retirement of Dr. von Neumayer, who had been director since January, 1876, and of Captain Dinklage, marine superintendent, after twenty-two years of very active work. The long list of meteorological logs received from the navy and mercantile marine shows that this branch of the service has been carried on with great activity; 556 steamships and 198 sailing vessels contributed observations during the year. The results appear in various useful publications, including daily synoptic charts and monthly pilot charts of the North Atlantic Ocean. The department of storm warnings and weather telegraphy has also been conducted with unabated vigour, to the success of which the recent establishment of a telegraphic service at 7h. a.m. has greatly contributed. The daily weather report issued by this department is one of the most valuable publications of the Seewarte, and includes observations from all parts of Europe.

WE have received the report of the Government astronomer of Western Australia, containing meteorological observations made at the Perth Observatory and other places in the colony during the year 1901. Very complete observations are published for the observatory, including temperature of the soil and evaporation, together with monthly means from the year 1876. General summaries are also given for more than forty climatological stations and rainfall statistics for a large number of places. Morning and evening weather forecasts form part of the routine work, and the results show that they have been remarkably successful; the general forecasts issued at noon, for the whole State, attained a complete success of 93 per cent. During the latter portion of the year astronomy also formed a prominent feature of the work of the observatory.

IN the *Zoologist* for July Mr. T. E. Lones discusses the identification of some of the birds mentioned by Aristotle, and shows that certain of the names have a generic rather than a specific sense. It appears that the name *boscas*, now used for the mallard, really indicates the widgeon, while *nētta*, now employed as the generic title of the red-headed pochard, properly denotes the first-named bird. In a second article Mr. R. C. J. Swinhoe publishes a fuller account of the *gisement* of the now celebrated chipped flints from Yenangyoung, Burma, and concludes that, in place of Pliocene or Miocene, they are really of late Neolithic, if not of the Iron, age. Mr. Lydekker has a note on the gaur of Burma, which is regarded as subspecifically distinct from the wild ox of India, and named *Bos gaurus readei*.

A COLLECTION of molluscs from the Vicksburg marls has enabled Mr. T. L. Casey to describe a considerable number of new species and genera in a recent issue of the *Proceedings* of the Philadelphia Academy. In the same journal Mr. A. E. Brown attempts to bring into something like order the various forms of garter-snakes (Eutænia) from the Pacific Coast of North America which have received distinct specific and subspecific names. Much interest attaches to a note by Miss S. P. Monks in the serial under consideration in regard to regeneration in starfishes. It has been stated that a fragment of a ray, without any portion of the central disc, cannot give rise to a new animal. This is disproved by the new experiments, in which the amputated free rays developed new bodies, while the mutilated starfishes produced new rays.

FROM among a series of papers published in the *Proceedings* of the U.S. Nat. Museum, special mention may be made of the following. In No. 1345 Mr. B. A. Bean records from Barbados an example of the small eel, *Ahlia egmontis*, hitherto known only by the type specimen from Florida. Reference is also made to a third example of the species from Florida. In No. 1341 the Rev. T. R. R. Stebbing describes two new species of amphipod crustaceans from Costa Rica. The walking-stick insects (Phasmidæ) of the United States form the subject of a paper (No. 1335) by Mr. A. N. Caudell, while Mr. W. H. Dall (No. 1342) contributes a synopsis of the bivalves of the family Astartidæ, with special reference to the American species. Finally, Mr. S. F. Clarke (No. 1343) shows that the Alaskan hydroid polyp, described by himself as the representative of a new family and genus (Rhizonema), belongs to one or other of the well-known genera Corymorpha and Lampra, the imperfect condition of the Alaskan specimens preventing closer identification.

IN *Animal World Illustrated* (the official organ for the R.S.P.C.A.) for July, Mr. E. V. Windsor, in an article entitled "Reflections by a Lover of Nature," passes an unqualified condemnation on insect collecting, as practised by the school-boy and the amateur entomologist. Stuffed birds as objects of decoration are likewise condemned, and we presume, although this is not stated in so many words, that collections of birds' skins, except in museums, would likewise come under the writer's ban. While we have much sympathy with Mr. Windsor's views, more especially as regards the stuffed birds, we believe that he carries these views somewhat too far. For instance, when he says that "there is little or nothing to be learnt from a creature when dead," we beg to join issue with him. Again, we have the following passage:—"In every branch of natural history this wanton slaughtering is, I fear, practised. In branches other than those I have just referred to it is practised almost exclusively by men who have a real claim to the title of naturalist, because these branches of natural science not being so popular, there are fewer amateurs." If by this the author means to condemn museum collecting, he cannot have our sympathy. As regards the contention

that nobody should collect without fully studying the habits of the species collected, we are in full accord with Mr. Windsor; but this by no means implies that collecting, under proper restrictions, should be abolished *in toto*. Were this to be done, it is probable that young collectors would confine their attentions to stamps and such like, whereby many a promising recruit would undoubtedly be lost to science.

THE *Agricultural Journal of the Cape of Good Hope*, the official publication of the Cape Department of Agriculture, is meant to circulate among the farmers of the Colony, and contains popularly written accounts of investigations conducted by the experts attached to the Department, articles on general farming, reports on farmers' congresses, legislative enactments, and other matters of agricultural interest. The current number (vol. xxii. No. 6, June) contains plenty of evidence of the difficulties which beset the South African farmer—infectious and parasitic diseases of all kinds among his stock, insect and fungoid pests among his crops. The two most active branches of the department are evidently those dealing with veterinary medicine and insect entomology; investigations of soil and manure problems are hardly of much consequence to the Cape farmer as yet. While the greater part of this number deals with veterinary matters, we get incidental allusion to one of the questions upon which the future of South African agriculture must depend, the successful introduction of suitable forage crops to carry stock through the winter; such plants as lucerne (alfalfa) or turnips are not in the regular routine of farming, and through the winter, when there is no grass on the veldt, the animals practically starve. We learn, too, that wheat-growing, as in some of the Australian colonies, must depend upon the introduction of rust-resisting varieties; in the absence of sorts remaining rust-proof there is at present little prospect of South Africa contributing to the "Granary of the Empire."

THE geology of the Cheadle Coal-field is described by Mr. George Barrow in a handy pamphlet of sixty-two pages, with a small colour-printed map attached to it, issued by the Geological Survey. The price is 2*s*. The area is an outlying portion of the North Staffordshire Coal-field, and Mr. Barrow gives full particulars of the seams of coal, with records of borings, and remarks on the probable extent of the workable measures. The underlying Millstone Grit and overlying Bunter and Keuper formations are likewise described, and special reference is made to the water-bearing strata. Attention is also directed to the Glacial drift, to the great amount of rain-wash, and to the recent river deposits.

THE fourth part of the memoir on the geology of the South Wales Coal-field, being an account of the country around Pontypridd and Maes-têg, has been written for the Geological Survey by Messrs. A. Strahan, R. H. Tiddeman, and W. Gibson. It is issued at 1*s*. 6*d*., with a separate colour-printed map (without Glacial drifts) also priced at 1*s*. 6*d*. The map, which is very clearly printed, embraces a tract almost wholly of Coal-measures, including much of the Pennant Grit, which forms the bold moorland features of the Coal-field. Millstone Grit, and small areas of Carboniferous Limestone, as well as Lias, Rhætic Beds, Keuper Marl, and Dolomitic Conglomerate are shown on the south. Tracts of river gravel, peat, alluvium, and blown sand are also depicted. The Glacial drifts are represented on another edition of the map, which is at present hand-coloured. The memoir deals chiefly with the details of the Coal-measures, and more especially with the lower measures of the south crop, comparative sections of which are given. The upper or Llantwit measures occur only in two small outliers. The structural geology is fully described, the Pontypridd anticline and other faults and disturbances being dealt with. A study of the Glacial deposits indicates that the main ice-flow had its source in Brecknock. It followed and filled the chief valleys, but failed to surmount the Pennant Grit scarp of Carn Mosyn. Subordinate ice-flows were, however, generated on these higher regions. Economic deposits are briefly described in a separate chapter. The Pennant Grit and the Llynfi rock in the lower measures supply materials for building, paving, and road-mending. The water-supply is obtained chiefly from springs and reservoirs, seldom from wells.

A SOCIETY for spreading information about St. Michael's in the Azores has published an illustrated booklet setting forth the charms of St. Michael's as a health resort and as a station for tourists. The brochure certainly contains much interesting information about this Atlantic island.

A NEW edition, making the twenty-sixth thousand, of Miss Agnes Giberne's "Sun, Moon, and Stars" has been published by Messrs. Seeley and Co., Ltd. A new chapter, part iv. of the volume, has been added, and deals briefly with celestial photography, the planets Mars and Eros, comets and new stars, as well as other topics. With the exception of these additions, the present edition is the same as the last.

A SIXPENNY booklet describing the legends and the story of the building of Stonehenge has been received from Messrs. James Henderson and Sons. In an appendix to the pamphlet a short account is given of recent attempts to ascertain the age of Stonehenge, and a reference is made to the wire fence with which Sir Edmund Antrobus has had the ruin enclosed. This action of Sir Edmund Antrobus is characterised as wise and public-spirited, since it will help in the preservation of this valuable monument of antiquity.

WE have received a copy of the meteorological observations for the year 1902 made at the Rousdon Observatory in Devonshire, which is continued under the superintendence of Lady Peek. The publication was prepared under the supervision of Mr. W. Marriott, of the Royal Meteorological Society, and contains remarks on the weather experienced during each of the months of 1902, and a useful collection of nine tables dealing with such subjects as the pressure, temperature, and hygrometric state of the air, temperature of the soil, wind direction, rainfall, amount of sunshine, &c The concluding table affords a useful summary of the annual results for the years 1884–1902.

TWO more numbers of the "Rural Handbooks" published by Messrs. Dawbarn and Ward, Ltd., have been received; one is by Mr. C. F. Townsend, and is entitled "Heating and Ventilation of Houses," the other is on "Utility Fowl Feeding and Management," and is by Mr. H. Francklin. These little books are simply written, and will serve to supply the principles upon which success in many pursuits depends. The book on ventilation is well illustrated, and contains practical information of a kind to enable any intelligent householder to secure good ventilation. The amateur poultry farmer will find numerous helpful hints in the second handbook as to how to make his hobby a profitable one.

THE current number of the *Quarterly Review* contains two exhaustive articles on subjects of scientific technology. The first is by Mr. J. Nesbit on the improvement of British forestry, and begins with a historical retrospect of the attempts made by legislation and otherwise to encourage

tree-planting and to preserve the forests. This is followed by an account of present practice and ideals. The work of the departmental committee appointed by the late Mr. Hanbury is dealt with very fully. The second article is on submarine vessels, and is unsigned. It is accompanied by four plates, and gives a full description of the attempts made to perfect this form of boat, and of the best models now in existence.

In reviewing Prof. G. P. Merrill's "Stones for Building and Decoration," when the book was first published in 1891, we cited it as affording an admirable example of the value of exact scientific knowledge when applied to the treatment of economic questions. The fact that since the date mentioned, as Prof. Merrill points out in the preface to the third edition which has now been issued, there has been a very notable increase in the output of building stone from American quarries, serves to emphasise the real connection between the scientific treatment of an industry and its success. The present edition differs from the previous ones in containing a revised chapter on methods of testing, a new chapter on the use of drift boulders for building purposes, and five maps showing the geographic distribution of the more important building stones. The new edition is published in this country by Messrs. Chapman and Hall, Ltd., and its price is 21s. net.

The additions to the Zoological Society's Gardens during the past week include a Chimpanzee (*Anthropopithecus troglodytes*) from West Africa, presented by Mr. H. Freeland; a Chacma Baboon (*Papio cynocephalus*) from South Africa, presented by General Sir Henry de Bathe; a Rhesus Monkey (*Macacus rhesus*) from India, presented by Mr. H. Baker; a Levaillant's Cynictis (*Cynictis penicillata*) from South Africa, presented by Mr. C. Marsh; an Egyptian Ichneumon (*Herpestes ichneumon*) from North Africa, presented by Dixon Bey; a Nagor Antelope (*Cervicapra redunca*), a Crowned Duiker (*Cephalophus coronatus*), a Serval (*Felis serval*), an African Civet Cat (*Viverra civetta*) from West Africa, presented by Sir G. E. Denton, K.C.M.G.; a Cuckoo (*Cuculus canorus*), British, presented by Mr. J. O. Pickington; a Back-marked Snake (*Coluber scalaris*), South European, presented by Mr. W. H. St. Quintin; a Common Toad (*Bufo vulgaris*), European, presented by Mr. H. Verrall; a Common Mynah (*Acridotheres tristis*) from India, a Chameleon Lizard (*Chamaeleolis chamaeleontides*), two Large Cuban Anolis (*Anolis equestris*) from Cuba, deposited; three Peacock Pheasants (*Polyplectron chinquis*) from British Burmah, purchased.

OUR ASTRONOMICAL COLUMN.

The Spectrum of *o* Ceti.—No. 41 of the Lick Observatory *Bulletin* is devoted to a discussion of the spectrum of Ceti by Mr. Joel Stebbins.

Using the Mills spectrograph modified to a one-prism instrument, he obtained a series of twenty-five good spectra during the period June, 1902, to January, 1903, in which period the star decreased in magnitude from 3·8 to 9·0. The spectrograms were obtained on Cramer's "Crown" or "Isochromatic" plates, are 28mm. in length, and extend from λ 3700 to λ 5600.

Mr. Stebbins finds that the absorption spectrum of Mira is very different from that of the sun; the calcium lines *g*, H and K are all present, but *g* is much stronger than in the solar spectrum. From measurements of six suitable lines he found that the velocity in the line of sight is constant, with a value of +66km. A summary of the dark lines discovered indicates the undoubted presence of Fe, Va, Cr and Ca, and the Al and Sr lines are prominent, whilst the presence of Mn and Ti is as yet considered doubtful.

The general conclusion arrived at is that many of the lines become broader as the star's magnitude declines, and this is undoubtedly true of the *g* calcium line at λ 4227·84. In the later photographs some new lines, not definitely coincident with solar lines, were observed, the chief of these being λ 3990·64, λ 4045·16, λ 4093·55, and λ 4097·08.

As regards the continuous spectrum, the photographs show that as the star declines in magnitude the continuous spectrum between λ 4300 and λ 5000 decreases in intensity as compared with that between λ 4000 and λ 4300.

Amongst the bright lines the hydrogen series is undoubtedly present, although previous observers have doubted the presence of Hα, Hβ and Hε; the two latter seem to have become stronger, compared with the other hydrogen lines and the continuous spectrum, as the star became fainter. The presence of bright metallic lines is as yet open to question. In 1898 Campbell observed Hγ as a triple line, and it was intended in this research to make polariscopic tests for the Zeeman effect, but, as the line was found to be single on the first spectrograms obtained, no such tests were made.

Mr. Stebbins discusses the principal theories concerning the remarkable variation in the magnitude of Mira, and is led to the conclusion that it is due to internal forces. Numerous tables and diagrams, and several reproductions of the spectrograms of Mira, accompany the dissertation.

Photographic Efficiency of a Short Focus Reflector.—In an abstract from No. 539 of the *Astronomical Journal* Prof. Schaeberle discusses the photographic efficiency of short focus reflectors, and describes some remarkable photographs obtained by himself with a 13-inch parabolic reflector of 20 inches focus. This reflector is mounted alongside a similar one, which is used as a finder and has an aperture of 12 inches, a focal length of 46 inches, and an eye-piece magnifying 360 diameters, on an ordinary English equatorial mounting, the photographic plate ($1\frac{1}{8}'' \times \frac{3}{4}''$) being placed at the focus of the mirror.

The results obtained showed that with less than five minutes' exposure the 13-inch revealed stars which are apparently beyond the reach of the 36-inch Lick telescope, and also revealed all the stars obtained by the 3-feet Crossley reflector with two hours' exposure.

The Ring nebula just shows on plates having had four seconds' exposure, and the central star and Lassell's No. 1 star (mag. 13) plainly show on an eight seconds' exposure. These photographs disclosed the true form of the Ring nebula, showing that it is a two-branched spiral which commences at the central star, and in a clockwise direction emerges on opposite sides near the minor axis. A reproduction of a photograph, which has been enlarged 150 times, accompanies the article, and shows the details of the nebula very clearly; this photograph was obtained on October 30, 1902, with an exposure of 128 seconds.

It has been shown by the photographs obtained that, under favourable conditions and using fast plates ("Seed" No. 27), this instrument can photograph stars fainter than the seventeenth visual magnitude in less than five minutes.

The Godlee Observatory.—In a brochure issued from the printing department of the Manchester Municipal School of Technology, the principal gives a detailed description of the Grubb telescope presented to the observatory connected with the school by Mr. Francis Godlee, of Manchester.

The mounting is of the twin equatorial type, and carries an 8-inch refractor and a 12-inch Newtonian reflector, besides a 6-inch achromatic doublet intended for astrographic work.

The refractor is provided with a filar micrometer, a finely divided position circle, and the usual accessories necessary for delicate visual observations. The polar axis is fitted with two R.A. circles, one of which may be set to sidereal time and rotates with the axis, so that the R.A. may be obtained by finding the difference between the readings of the two circles. The driving of the telescopes is performed by the usual clockwork arrangements, and is electrically regulated by a pendulum having a perfectly *free* movement; the mounting is so designed as to permit the instrument to make the whole circumpolar revolution without interruption.